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The

# mineral waters and baths

of

# Tarasp

(Tarasp-Schuls)

in

the lower Engadine, canton of Grisons.



Short survey destined particularly for medical practitioners.



Coire, 1866.

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Motto.

„Postquam superiore æstate in Rhæticis  
alpibus fontem salsacidum bibi, miraculum  
naturæ, semper bene valui, et quidem multo  
melius, quam ante plurimos annos.“

Corrado Gessner 1577.

As the New bath Establishment of Tarasp-Schuls, opened since 1864, is now entirely finished and begins to be more generally known, we beg leave, for the approaching season, to present to the medical public a succinct description of the New Establishment, being persuaded, that both for its remarkable richness of mineral springs of different kinds as for its climatic and natural advantages it deserves in a high degree the attention of physicians.

The springs of Tarasp-Schuls rise in the lower part of the Engadine, that long Rhaetian valley, which, in the length of about 60 miles, forms the South-Eastern frontier of Switzerland. Dr. Papon, in his monography on the Engadine, published 10 years ago, describes it as «an unknown Alpine Country» and this term may still be applied at least to the Lower Engadine, while for several years the Upper Engadine, owing to its grand mountain scenery and to the considerable number of visitors of the Bath of St. Moritz, has attained a rapidly increasing celebrity. Bad roads and indifferent means of communication have till quite lately almost isolated the Lower Engadine from the rest of the

world, while now the comfortable Federal Mail-Coach and the Telegraph have penetrated also in this Territory.

The villages of Schuls and Tarasp, on the territory of which our springs rise, are a half day's journey from St. Moritz and 9 miles from the Austrian frontier near Martinsbruck; their elevation above the Sea is from 4000 to 4500 feet. The alpine nature of this valley bears a less severe character than the landscapes of the Upper Engadine; mountain peaks of majestic formation surround a valley which widens in a circular form and through which the impetuous Inn flows; the vegetation already shows a greater richness of forms than in the upper valley: the extensive cultivation of rye and flax, the orchards near Schuls, as well as the characteristical luxuriancy of the Flora in general are as many proofs of a milder climate. The latter we do not hesitate to count among the greatest advantages of the Bath: it is an alpine climate with all its bracing elements, yet mitigated in that way that those sudden changes of temperature, those unexpected snow falls, which for weaker and more delicate constitutions not seldom prove dangerous, form rather the exception. The mild and not dry character of the air recommends itself especially to convalescents, to anemic or highly nervous individuals, with whom, and principally with the latter, the charming climate of the high Alps does not always well agree.

Observations made at the Establishment and compared with those of the neighbouring stations show for the months of July and August a mean temperature of from 13-15 (centigrade) with a mean daily variation of from 8-9. In the two last seasons, which were partly rather unfavourable, we noted for the months of July and August as maximum 26,5

and 28,3, as minimum 3,0 and 6,0. The direction of the valley excludes almost entirely the North- and the North-East winds while the South East and North-West predominate.

The snow melts in the valley already in the month of April: Summer, as is generally the case in the mountains, arrives rapidly so that already in the month of June the season can be opened; the season lasts to the end of September, which in the high mountains is particularly remarkable for its genial and constant weather.

The soil, in which rise the numerous mineral springs of Schuls-Tarasp is an excavation — inlaid in Gneiss — of gray, decaying, calcareous clay-slate, frequently interrupted by serpentine stone and diorit and with numerous interspersions of gypseous earth.

The direction of the excavations is generally from S. W.—N.E. and according to researches made by Professor Theobald all the mineral springs rise in one crevice which follows the same direction. The abundant efflorescence of sulphuric Magnesia on the slate-rocks, the numerous banks of ochre, the exhalations, reminding of volcanic phenomena, of carbonic acid and sulphuretted hydrogen called mofettes, must already lead to the supposition, that those springs might be particularly rich in mineral elements, and indeed on an extension of not quite three miles in a straight line there is a great number of mineral springs, which partly are very abundant.

They are principally the following (the springs with new reservoirs being marked with \*):

### 1. Saline springs.

\* St. Lucius.

\* The Emerita.

\* The Ursus.

\* The New Bath Spring (all these are beside the Establishment).

### 2. Acidulous Chalybeate springs.

\* The Bonifacius spring (rises 20 minut. above the establishment; beside it rises another acidulous spring).

\* The Carola spring, close to the establishment (formerly called spring du Pont).

The Wyh spring with an older reservoir.

The Suotsass spring.

The Runna spring,

The Talur spring.

The Rimmias spring (the five latter are near the village of Schuls).

The Baraigla spring, near the establishment.

### 3. Sulphurous springs,

The spring of Val Plafna, behind the village of Tarasp.

\* The spring of Val Dragun, near Schuls.

### 4. Mofettes (near Schuls).

The Felix Mofette (exhalating carbonic acid).

The Dragun Mofette (exhalating sulphuretted hydrogen).

If we consider further that smaller isolated springs are not included in this enumeration and that for instance on the territory of the village of Sins, contiguous to Schuls there rise perhaps above a dozen of strong acidulous chalybeate springs, we may say, that the territory of the mineral springs

of the lower Engadine, considering not only the number but also the variety of the mineral waters, is perhaps the richest in whole Europe. It must therefore appear very strange, that so rich natural gifts should, with few exceptions have been almost entirely neglected till quite lately, and that only a very small number of physicians had any knowledge of so rare a combination of different mineral springs. Indeed physicians and travellers of note (Gessner, Wagner, Ebel) have long ago mentioned the extraordinary power of the Tarasp saline springs; about the year 1830 this was done by the celebrated Schönlein, who visited himself twice our springs being struck with the very favourable effects they had had on some of his own patients. Quite lately the Tarasp-Schuls waters have been warmly recommended especially by Leb'rt, Professor Dittrich, Meer-Ahrens and the English man Lee. Also some physicians of this country, particularly Dr. J. A. Kaiser have highly deserved of the analysis and the investigation of the sanative powers of the Tarasp water- We do not intend giving a history of the springs, we only repeat, it was owing to the very indifferent means of communication and to the unfavourable circumstances of the interested commons that Tarasp has not acquired much sooner and in more extensive circles the fame which it deserves. But owing to these circumstances nothing was done till towards the year 1860, when commissioned by the Great Council of the Grisons Dr. Ad. de Planta-Reichenau made a thorough analysis of the 12 larger springs \*); soon a joint-stock-company was formed which, disposing of a very considerable capital, took a lease of all the springs on the territory of Tarasp-Schuls, bought for the construction of thee

\*) The former analyses of Capeller, Casselmann and Löwig had only extended to three springs.

establishment the farm of Nayrs, situated on the Inn between the villages of Schuls and Vulpera, made there an embankment on the river and constructed a bridge and a carriage-road leading to Vulpera. Since now at the same time the postal road from the Upper Engadine has been finished as far as the frontier of Tyrol, by which the new bath has been made perfectly accessible on the Swiss side, we may nourish the confident hope, that the number of visitors, which of late has visibly increased, may soon attain proportions corresponding to the very considerable sacrifices which have been made for the raising of the place and that Tarasp will rise to the rank of a European Bath.

On the left bank of the Inn, opposite the drinking springs and connected with them by a convenient covered bridge rises, with the principal front towards the South the new establishment (3930 feet above the Sea) a building remarkable from its architecture as well as from its grand proportions (500 feet length and 50 feet height) and which with respect to its whole structure and to the richness of its accommodations not only ranks with the first public establishments of Switzerland but is the very first of the Swiss bathing establishments.

The building offers accommodation for 300 persons. The rooms are without exception spacious, elegantly furnished, in the central part there are private sitting rooms, balconies etc.

In the left wing of the building are fifty six bath cabinets, divided into a ladies' and gentlemens compartment. Every baignoire can be filled through separate pipes with saline water, acidulous chalybeate water or simply with, sweet water; the water enters cold and is within a few minutes brought to the requisite degree of heat by means of steam

There are also douche cabinets connected with these bath rooms.

In the right wing is the spacious dining-room, remarkable from its rich decoration and the beautiful ceiling in the renaissance style.

In the ground-floor of the central building are the different rooms for social recreation, coffee-rooms, billard-room, reading-room, ladies-saloon, with the necessary requisites of amusement, as pianoforte, news papers etc. If we walk out of the building, we have before us the garden planted in the english style, extending to the bank of the Inn, with a fountain rising more than 40 feet. Behind the building on the slope of the mountain there is also a large promenade ground with terraces and plantations. On each side of the covered bridge leading to the right bank is a small symmetrical building, that of the left bank contains the apparatus for the warming of the baths by steam, the sucking-pump and the reservoir of the saline waters; the building on the right bank covers the recently discovered Carola spring and its reservoir. Along the postal road up the valley, at about five minutes distance is the coach-house with the stables (equipages, horses, donkeys).

In crossing the bridge to the right bank, we arrive, going up the river, after a few minutes walk, in the shady park, with numerous winding paths, benches etc. in a dense alder-wood.

In the principal building are for the communication in the interior and with the dependencies a telegraphic apparatus and electric clocks. The physician dwells in the establishment and has his own well furnished pharmacy.

As manager of the hotel Mr. Ernest Maulick (formerly in Kissingen) has been engaged and has proved per-

fectly worthy of the high reputation which he had acquired by the direction of similar concerns.

The board is thoroughly calculated for patients without being too scanty; of course the diet of every individual is regulated by the prescriptions of the physician.

A hair-dresser is constantly in attendance in the hotel; there are also shops to satisfy the wants of the public. The stage-coaches stop at the building and take there directly the travellers, the telegraph and post-offices however are in the neighbouring village of Schuls (25 minutes distance).

If we leave the hotel in order to take an easy walk, the landscape immediately surrounding the establishment offers a great variety of views, which strike the beholder by their grandness and the richness of their colours. The picturesque chatlau of Tarasp, with the quiet lake and the original convent of capuchins at the base of its hill, the plateau of Schuls with its beautiful slopes and alpine pastures, the park-like, hilly environs of Vulpéra, the solitary hamlet of Avrona, all these different spots, surrounded by magnificent towering mountain peaks, from 10--11000 feet high, offer the friend of nature ever new recreations and ever varying enjoyments.

We may here yet observe, that the environs of Tarasp are also distinguished by their richness in objects of natural history. The mineral kingdom offers local rarities and the Flora is considered one of the richest and most interesting in Switzerland; the student of zoology likewise will find ample rewards for his studies especially in the entomological branch. With these few leaves however we do not intend to enter into the details of topography and natural history although there are many things worthy to be mentioned; this is rather

the object of a circumstantial monograph on the bath, which we intend to publish. We therefore after these preliminary observations enter into the proper object of our communication, which is to present the medical public a succinct sketch of the composition and the action of the Tarasp mineral springs which are at present applied to the therapeutic use.

## 1. Group. Natron saline waters.

The natron saline waters of Tarasp rise close to the banks of the Inn, a few minutes beneath the establishment. The most important of them are the two drinking springs on the right bank and the bathing springs on the left bank. The drinking springs, called in honour of the native saints St. Lucius and St. Emerita, rise close to each other and are as yet in a provisory way covered by the old spring-house. These are properly the springs of Tarasp, of ancient fame, which formerly were used almost exclusively and were accessible only by a steep foot-path while now a very spacious way leads from the bridge to the springs.

### The St. Lucius spring.

The St. Lucius spring, which for its superior strength has ever been a favourite, shows a continual strong ebullition in consequence of the very considerable development of carbonic acid gas. The water is clear, sparkling and, if drunk fresh, of a piquant taste; but if it is let to repose or if the carbo-

nic acid is made to escape by warming the water, there appears an intensive, alcaline saline taste, at the same time the water gets, only for a short time, strongly troubled.

Supply of water: 990 Cub. Quintals per minute.

Temperature  $5\frac{1}{2}$ — $6\frac{1}{2}$  Centigrade.

Specific weight: 1013.0.

Fixed residuum of the evaporated water: 12,1610 p. m.

According to the analysis made by Dr. A. de Planta the spring contains the following fixed substances:

I. The carbonic acid salts calculated as simple carbonates:

<i>Fixed substances:</i>	in 1000 parts of the water.
Carbonaté of Lime . . . . .	1,6188
<i>Carbonate of Magnesia</i> . . . . .	0,6610
<i>Carbonate of protoxide of Iron</i> . . . .	0,0198
<i>Carbonate of protoxide of Soda</i> . . . .	3,5455
<i>Muriate of Soda</i> . . . . .	3,8283
<i>Joduret of Sodium</i> . . . . .	0,00023
<i>Sulphate of Soda</i> . . . . .	2,1546
<i>Sulphate of Potass</i> . . . . .	0,3903
Silicic acid . . . . .	0,0321
Phosphoric acid . . . . .	0,0003
Clay . . . . .	0,0002
Vestiges of Fluorin, Manganese	
Total of fixed substances . . . . .	12,2511
directly indicated . . . . .	12,1610

II. The carbonic acid salts calculated as water-free  
Bicarbonates:

<i>Fixed substances:</i>	in 1000 parts.
Bicarbonate of Lime . . . . .	2,3310
<i>Bicarbonate of Magnesia</i> . . . . .	1,0072
» <i>Protoxide of Iron</i> . . . . .	0,0273
» » <i>Soda</i> . . . . .	5,0172
<i>Muriate of Soda</i> . . . . .	3,8283
<i>Joduret of Sodium</i> . . . . .	0,0002
<i>Sulphate of Soda</i> . . . . .	2,1546
» <i>of Potass</i> . . . . .	0,3903
Silex . . . . .	0,0321
Phosphoric acid . . . . .	0,0003
Clay . . . . .	0,0002
Vestiges of Fluorin, Manganese	
Total of fixed substances . . .	14,7887

Therefore in 1 pound = 7680 grains or 16 ounces there are the following substances:

(The carbonic acid salts calculated as simple carbonates):

Carbonate of Lime . . . . .	12,4323	Grains.
Carbonate of Magnesia . . . . .	5,0764	"
<b>Carbonate of Protoxide of Iron</b> . . . . .	<b>0,1520</b>	"
Carbonate of Protoxide of Soda	27,2294	"
Muriate of Soda . . . . .	29,4013	"
Joduret of Sodium . . . . .	1,5360	"
Sulphate of Soda . . . . .	16,5473	"
Sulphate of Potass . . . . .	2,9975	"
Silex, phosphoric acid etc. . . . .	0,2503	"
Total of fixed substances . . . .	<b>95,6225</b>	Grains.

*Gaseous constituents:*

Free and half-free carbonic acid . . . . .	34,8871
Carbonic acid quite free . . . . .	15,3984

Calculating the volumen in one pound (32 cub. inches) the temperature of the spring being 6,2° C. and the normal pressure 0,76.

Free and half-free carbonic acid . . . . .	73,91 cub. inch.
Carbonic acid quite free . . . . .	33,36 „ „

Finally the analysis of the gas bubbles boiling up directly in the springs shows :

Carbonic acid . . . . .	993,44	C. Quint. m.
Nitrogen . . . . .	4,27	„ „ „
Oxygen . . . . .	2,29	„ „ „
1000,00.		

## The St. Emerita spring.

This spring, which from a traditional prejudice has been rather less employed, closely resembles the former. There is less sparkling and ebullition in its reservoir, and having less carbonic acid it tastes more of salt. In the reservoir, there is deposited a thick layer of oxide of iron. Of Jodine it contains hardly a vestige.

Supply of water: 366 C. Quint.

Temperature; 6,2° C.

Specific weight: 1012,9.

In 1  $\bar{a}$  = 7680 grains or 16 ounces there are the following substances:

(The carbonic acid salts being calculated as simple carbonates):

*Fixed substances:*

Carbonate of Lime . . . . .	12,4016
Carbonate of Magnesia . . . .	4,9766
Carbonate of Protoxide of Iron . .	0,1397
Carbonate of Protoxide of Soda . .	28,5350
Muriate of Soda . . . . .	29,3813
Sulphate of Soda . . . . .	16,4167
Sulphate of Potass . . . . .	3,3369
Silex . . . . .	0,0921
Vestiges of phosphoric acid, clay, Jodine, brome, fluorin, manganese	
	<hr/>
	Total: 95,2799

*Gaseous constituents:*

Free and half-free carbonic acid . . .	33,2712
Carbonic acid quite free . . . . .	13,3009

Calculating the volumen in one pound (=32 C. inches) the temperature of the spring being 5° R. (=6,2° C.) and the normale pressure (0,76 M.):

Free and half-free carbonic acid	70,49 C. inch.
Carbonic acid quite free	28,84 , ,

The gas bubbles boiling up in the spring consist of:

Carbonic acid . . . .	992,13 C. C. m.
Nitrogen . . . . .	5,33 "
Oxygen . . . . .	2,54 "
	<hr/>
	1000,00

## The St. Urs spring.

This spring is situated opposite to the drinking springs on the territory of Schuls, therefore it was formerly known as the „Schuls saline water». Formerly it was a good deal employed for internal use, but it now serves, as is the case with the «new bath spring», almost exclusively to supply the baths.

Through pipes the water is pumped directly from the engine-house in a reservoir, from where it flows in the pipes of the baths.

The St. Urs spring differs in quality little from the drinking springs, but it is not quite so rich in fixed substances.

Specific weight: 1,0104.

Temperaturc: 8,1° C.

Supply of water: 1000 C. Quint per min.

In 1 pound — 7680 grains or 16 ounces are contained:

(The carbonic acid salts being calculated as simple carbonates):

*Fixed substances:*

Carbonato of Lime . . . . .	10,8702
Carbonate of Magnesia . . . .	4,3415
<b>Carbonate of Protoxide of Iron . . .</b>	<b>0,1036</b>
"    "    "    of Soda . .	22,6222
<b>Muriate of Soda . . . . .</b>	<b>22,1752</b>
<b>Sulphate of Soda . . . . .</b>	<b>11,9769</b>
Sulphate of Potass . . . . .	2,1719
Silex . . . . .	0,1843
Vestiges of phosphoric acid, clay, Fluorin, Jodine, Manganese	
Total of fixed substances	74,4458

*Gaseous constituents:*

Free and half-free carbonic acid . . . 29,5218 Gr.

Carbonic acid quite free . . . . . 13,1627 "

Calculating the volumina in 1  $\pi$  (= 32 C. inches), the temperature of the spring being 8,1° C. and the normal stand of the barometer (0,76 M.):

Free and half-free carbonic acid 62,56 Cub. inch.

Carbonic acid quite free 28,71 "

The **new bath spring**, rising quite close to the former has the same chemical composition, but its supply of water is more abundant.

Lersch calls the Tarasp waters one of the most powerful and most precious mineral waters of Europe\*) which expression is amply confirmed by a comparison with other celebrated alcaline springs:

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\*) On mineral springs II. (page 1576) out of which the following table is taken.

There are contained in 1000 parts:

Springs.	Fixed substanc.	Carbonic acid	Muriate of Soda.	Carbo- nate of Soda.	Sulphate of Potass.	Magnesia (CO <sup>2</sup> e SO <sup>3</sup> )	Jodur. of Sodium.	Carbonate of Proto- xide of Iron.
Tarasp (Lucus)	122.51	45.426	38.283	35.455	21.546	3.903	6.61	0.0023
Kissingen. (Racoczy)	85.54	24.78	58.216	—	—	—	6.113	—
Vichy (Grande Grille)	52.49	26.65	5.43	36.54	0.168	3.362	2.0	0.316
Karlsbad (Sprudel)	59.68	10.123	11.36	11.8	19.48	12.2	0.52	—
Bilin (Josepsquelle)	51.04	23.62	3.811	31.182	7.212	2.462	2.537	0.04
								0.079

Whilst then the springs of Tarasp surpass all others known with respect to the amount of fixed substances, and of carbonic acid gas, they are almost identical with those of Vichy as regards the quantity of carbonate of soda which they contain. As respects the alkaline sulphates, they resemble most those of Carlsbad, and next to the Kissingen springs, they contain the largest proportion of muriate of soda and iron. They are moreover, distinguished from all the others by their containing iodure of sodium, which evidently manifestes itself in their therapeutical results.

## Action and use of the waters.

The action of the Tarasp water on the organism corresponds exactly to the principal groups of its constituents, it manifests itself in dissolving, in promoting the secretions and in strengthening. It acts first through the carbonate of Soda locally on the digestive mucous membranes, by dissolving, absorbing the acids and promoting the secretion; at the same time the activity of the liver and the gastric salivary gland is stimulated; it penetrates speedily in the blood, where it manifests its action of dissolving and promoting the secretions by abundant diurese, and according to circumstances also by augmenting the secretion of the mucous membrane of the lungs. In this action the alkaline carbonate is essentially aided by the more stimulating salt and, in the altering process, by the iodine.

The alkaline sulphates manifest themselves directly through their relaxing action. Yet it would be a great mistake, to consider the Tarasp water only as a laxative, although it must act as such, its real importance is in the action which it manifests having penetrated in the blood, on the whole process of formation of blood and absorption of abnormal fatty depositions and resorbable pathological neoformations. At the same time the action of the iron is to be considered, to which we must partly ascribe the bracing, strengthening action of the Tarasp water; it is this action which forms one of the principal advantages of our spring. The abundant carbonic acid acts directly as an animating, stimulating element on the mucous membranes and glands, in the second instance it essentially aids the action of the carbonates. Not seldom the effect of this gas rises to toxic symptoms there arrive giddiness, heaviness of the

head, humming of the ears and still more unpleasant symptoms; or else the gas stops the excretive function of the bowels wherefore in such cases the mineral water must not be drunk immediately but only after having been for some time exposed to the air.

The baths, besides unmistakably furthering and promoting the process of altering the blood and glands, which has been begun by the internal use of the mineral water, manifest their action still more particularly by the beneficial calming and strengthening of the nervous system. They are particularly serviceable for chronic rheumatism and certain diseases of the skin.

The abuse which was formerly made of the saline water, in drinking unreasonable doses and observing an injudicious diet, has often been very severely punished. But even in using the water properly dietary prescriptions and eventually more violent effects of the water must be carefully observed. This is the case especially in the beginning of the course where sometimes loss of appetite, indigestion, disturbed sleep and general excitation are experienced, which symptoms not always require a special medicamental treatment, but may render necessary a change of system in the course. It also happens that after some weeks the system becomes saturated, the blood surcharged with alcali which is manifested by increasing loss of appetite, strong diarrhoea, palpitation, bad looks, nervous debility etc. in which case the course must be suspended at once. These however are rather the exceptions. In most cases the animating and strengthening action of our mineral spring manifests itself very soon, by a peculiar sensation of relief, which stimulates even lazy persons or such as are little accustomed to walking, to take walking exercise; the appetite increases rapidly, and with it the strength and

the good looks of the patient. This animating action has particularly a very favourable influence in cases of mental depression.

The dose of the saline water is in general, beginning with from 2—3 glasses (at 6 ounces) and gradually increasing, 6—8 glasses (Lucius or Emerita) to be drunk in the morning before eating, with a continual easy motion, in pauses of 15 minutes\*), Several fluid stools follow generally before breakfast, (which may be taken a half hour after the last glass) or immediately afterwards, wherewith the action of the water in this respect is closed for the day. The augmented diurese however shows itself more in the afternoon and evening. In cases where the water does not act sufficiently on the bowels, or where its carbonic acid produces congestions etc., which may happen in the beginning of the course or when the stools are slow in arriving, the water is let to repose or the glass is put in warm water, by which means the inconvenient gas escapes partly. It is also convenient, to drink late in the evening or early in the morning in bed 1—2 glasses of water, which has reposed. Patients with very sensible stomachs, with whom the low temperature of the water (6 centigrade) does not agree, must also warm the water a little, the water may also be taken with a small addition of warm milk or whey.

The baths, which very essentially promote the effect of the course are warmed to 25—28° C. and are taken, according to circumstances daily or every second day, during 30—40 minutes.

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\*) A mean dose of 5 glasses at 6 ounces corresponds about to a half drachm of Sulphate of Soda, 1 drachm of salt,  $2\frac{1}{2}$  scruples of Carbonate of Soda and not quite 3 grains of Joduret of Sodium.

With respect to diet in many cases, especially when weakness results from atony of the digestive and assimilative functions, it is less abstention from food, which in mineral water courses is often carried too far, that is necessary, than rather that the patient, while avoiding of course surfeits of any kind, absolutely abstains from such food, as is directly opposed to the intended sanative effect, for instance fat and acid food, cheese, heavy pastry, salad, raw fruit, beer and secondly that he observes rigorously the fixed hours for his meals and takes in the intervals as little food as possible. Often also a glass of wine, Valteline or old Margraviat can be permitted. The food however must principally consist in light coffee with milk, fresh soups, fresh meat and poultry, and boiled vegetables. Breakfast and supper must be as frugal as possible.

A principal moment beside the diet is also moderate but frequent exercise, for which Tarasp, with its varying environs and delicious air offers the most desirable opportunities. Fatiguing excursions, to which some patients are tempted, must however be decidedly avoided during the course for experience shows, that a bad cold or a great fatigue may have a very detrimental influence on the success of the course.

With respect to clothing light woollen stuffs are here, as generally in the mountains, most adapted; warm upper-garments are necessary for exceptionally cooler days and, during the journey, for crossing the alpine passes.

The duration of the course is in general from 3--5 weeks.

For the after-course we recommend, where the proximity of the establishments is desirable, according to circumstances, St. Moritz (chalybeate springs) Le Prese (sul-

plurous springs, fine climate, beautiful country), Davos (whey, delicious air), Alveneu (sulphurous springs), Bormio and Ragatz (thermal waters) all of them only 1—1½ days journey distant from Tarasp.

During the after-course the Tarasp saline water itself is also often drunk in small doses for about a fortnight. The saline water is also exported in large or small chests with large or small bottles\*).

## Indications and contraindications.

According to the experiences of many years the Tarasp saline waters have proved beneficial especially in the following diseases :

1. General **fattiness**, corpulence, **hypertrophical symptoms** especially of the **glandulous Organs**, concretion of fat in them, **light neoplasmes** (so striking in goitres), **scrofula**.
2. **Chronic diseases of the liver** and especially: **Chronic** (biliary) swelling and hyperemia of the liver, accompanied with icterus, fatty liver as consequence of good living, gall-stones.
3. **Diseases of the digestive organ.**
  - a) **Dyspepsies**, chronic gastric catarrh, chronic vomiting, **excessive formation of acid**, being consequences of frequent errors in diet, good living and want of exercise and being combined with disease of the liver.

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\*) In the year 1864 there were exported above 30,000 bottles, this year 47,000 bottles.

- b) **Chronic catarrh of the intestines**, obstinate constipation especially if resulting from general atonic condition of the intestines or from frequent abuse of laxatives.
- c) The numerous diseases comprehended as **hemorrhoids**, which often result from irregular and torpid circulation of blood in the hypo-gastric organs and from defective physiological action of them, also the abdominal plethora, infarctions and quite especially disposition to **hypochondriasis**.
- d) **Helminthiasis** (the occasional expulsion of toenia during the use of the Tarasp water has often been observed).

4. **Diseases of the spleen**, especially chronic tumours consecutive to attacks of intermittent fever, if they are not yet advanced into a hydremic state.

5. **Diseases of the lungs**, especially chronic bronchial catarrh, milder forms of bronchiectasy, short breath (in consequence of great corpulence) chronic laryngeal catarrh and hoarseness\*).

6. **Diseases of the urinary passages.**

\*) How far the Tarasp water may be employed against incipient pulmonary tuberculisation, must yet be more exactly demonstrated by careful observations. There is a general strong belief in the efficaciousness of the water in such cases and even some physicians affirm having observed decidedly beneficial results. (The combination of the saline water with our vigorous chalybeate springs might prove beneficial for certain affections of the lungs as is the case with diseases of the spleen and affections of the female genital system.)

Catarrhal affection of the kidneys and bladder, disposition to the formation of concretions (gravel, sand, stone).

8) **Diseases of the uterus and the ovaries.** Chronic infarction of the uterus and incidental anomalies of menstruation, blenorrhoea, swelling and tumours of the ovaries.

8. **Chronic gout and rheumatism.**

9. **Chronic diseases of the skin,** especially eczema, particularly where they are related to disorder in the formation of blood and to abnormal functions of the digestive and assimilative organs.

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The Tarasp saline waters are **contraindicated** in the following cases:

1. Decidedly hydremic and cachectic febrile affections in general (gangrenous cachexy, decided tuberculosis, albuminuria) cases of great weakness and failing away, in which cases the use of the Tarasp saline water may have very serious consequences.
2. Disposition to inflammation of the affected organs (stomach, liver) and dispositions to loss of blood, to cerebral congestions and apoplexy.
3. Tumours and abscesses in the digestive organs, amyloide, cirrhotic and other deteriorations of the liver parenchyma.
4. Decided diseases of the heart (especially defects of the valves).
5. Epilepsy and pregnancy.

## II. Group. Acidulous chalybeate springs.

The acidulous chalybeate springs of Tarasp-Schuls have hitherto much less than the saline waters enjoyed the consideration which is due to them from the therapeutical point of view. Yet one glance on the analyses shows, that they are very remarkable with respect to quality and to quantity, and that in another place and with more favourable means of communication they would have been sufficient in themselves for creating a highly frequented bath.

At present, being arranged for drinking and for bathing courses, our chalybeate springs recommend themselves as well for being used alone and separately, as in combination with the saline water, for after-courses and in general where a special tonic action is to be attained. The combination of our springs permits also the joint use of them by patients related to one another, who suffering from dissimilar affections would otherwise not be able to visit, as they might desire, the same bath.

### The St. Bonifacius spring.

This spring rises at twenty minutes distance above the establishment, on the right bank of the Inn; a small bridge leads to it from the postal road on the other side. It is the most vigorous chalybeate spring in our territory and of a composition as excellent in its kind as are the saline springs in theirs. The water is brought to the establishment every mor-

ning, freshly bottled so as to conserve the carbonic acid gas, but it may also be drunk at the spring; it has a particularly vigorous and distinguished taste.

To the following analysis of the Bonifacius spring we add for comparison that of the celebrated chalybeate spring of St. Moritz (new spring) also made by Dr. A. de Planta.

Bonifacius spring:	St. Moritz:
specific weight: 1002,9.	1002,39
Temperature: 7,5° C.	4,3° C.
In 1 pound = 7680 Gr. or 16 ounces are contained.	

(The carbonic acid salts being calculated as simple carbonates.)

<i>Fixed substances:</i>	<i>Bonifacius spring:</i>	<i>St. Moritz:</i>
Carbonate of Lime . . . . .	14,609 . . . . .	6,844.
Carbonate of Magnesia . . . . .	2,585 . . . . .	1,216.
Carbonate of Protoxyde of Iron 0,253 . . . . .	0,253.	
"    "    Manganese — . . . . .		0,033.
"    "    Soda . . . . .	7,929 . . . . .	1,593.
Muriate of Soda . . . . .	0,437 . . . . .	0,310.
Sulphate of Soda . . . . .	1,648 . . . . .	2,673.
"    "    Potass . . . . .	0,733 . . . . .	0,157.
Silex . . . . .	0,142 . . . . .	0,380.
Phosphoric acid . . . . .	— . . . . .	0,005.
Clay . . . . .	— . . . . .	0,003.
Total: . . . . .	28,336 . . . . .	13,467.

(Vestiges of Iodin,  
Brome, Fluorin.)

*Gaseous constituents:*      *Bonifacius spring: St. Moritz:*

Free and half-free carbonic acid	28,581	23,787.
Carbonic acid quite free	17,412	19,369.
Calculating the volumina in the pound (= 32 Cubic inches) with the temperature of the spring and normal stand of the barometer:		
Free and half-free carbonic acid	62,23	62,88 C. in.
Carbonic acid quite free	37,91	51,20 ,

The supply of water of this spring which formerly was believed to be very small, has considerably increased since it has been newly enclosed, it is now more than sufficient for any wants of the bath; we have besides begun to enclose and to render accessible another spring, rising close to the Bonifacius spring; this new chalybeate spring is perhaps still more vigorous, but it has not yet been analyzed.

## The **Carola** spring.

This vigorous spring, which a few years ago was quite unknown, was accidentally discovered on blasting the rocks for the construction of the right tête-de-pont. It is at few yards distance from the establishment, it is much employed in drinking and affords at the same time the chief supply of water for the chalybeate baths. The water is perfectly clear, sparkling, of an agreeable, first piquant then characteristically inky taste.

The analysis made last year by Dr. A d de Planta has given the following result:

Specific weight: 1001.10.

Temperature: 6,5° C.

Supply of water 29064 C. Quint. M. per minute (about 20 federal pots).

In one pound = 7680 Gr. or 16 ounces are contained:  
 (The acid carbonic salts being calculated as simple carbonates.)

*Fixed substances:*

Carbonate of Lime . . . . .	4,2071
Carbonate of Magnesia . . . . .	0,8094
Carbonate Protoxyde of Iron . . . . .	0,1259
Muriate of Soda . . . . .	0,0168
Muriate of Magnesia . . . . .	0,1466
Sulphate of Soda . . . . .	0,2825
Sulphate of Potass . . . . .	0,4992
Silex . . . . .	0,0737
 Total of fixed substances	 7,1612

*Gaseous constituents:*

The acid carbonic combined with the carbonates to bicarbonates etc. . . . . 2,3224

Carbonic acid quite free . . . . . 27,5872

Calculating the volumina in 1 pound (= 32 C. inches) with the temperature of the spring and 0,76 M. normal stand of the barometer.

Free and half-free carbonic acid 42,86 C. inches.

Carbonic acid quite free . . . . . 37,86 ,

«Compared with springs of a similar composition this spring is most approximated in its nature to that of the old spring of St. Moritz, and to the Pauline of Schwalbach, and also resembles the springs of Rippoldsau and Pyrmont. Considering the favourable proportion existing between its iron and its dissolving saline constituents, it may justly occupy an intermediate place between the above-mentioned springs. (Planta.)»

(We also add, that as the reservoir of this spring was found to be not sufficiently impermeable, it has of late been entirely rebuilt, which must needs have improved the quality of the water.

### **The Wyh spring** (also called Campells spring.

This spring, which as «Schuls acidulous chalybeate water» was long ago known and much employed in drinking rises in the meadows near Upper-Schuls. The water is clear, colourless and pretty sparkling, it has a very refreshing, agreeably acidulous and markedly chalybeate taste.

Specific weight: 1002,0.

Temperature: 8,7° C.

Supply of water: 10870 C. Quint per minute.

In 1 pound = 7680 G. or 16 ounces are contained:

(The carbonic acid salts being calculated as simple carbonates):

*Fixed substances:*

Carbonate of Lime . . . . .	9,4671
Carbonate of Magnesia . . . . .	0,6481
Carbonate Protoxyde of Iron . . . . .	0,2035
Carbonate Protop. of Manganese	0,0130
Carbonate Protoxide of Soda . . . . .	0,0284
Muriate of Soda . . . . .	0,0161
Sulphate of Soda . . . . .	0,0867
Sulphate of Potass . . . . .	0,0837
Silex . . . . .	0,1474
Phosphoric acid . . . . .	0,0015
Clay . . . . .	0,0007
Total of fixed substances	10,6962

*Gaseous constituents:*

Free and half-free carbonic acid . . . . .	22,1498
Carbonic Acid quite free . . . . .	17,5526
Calculating the volumina there is in 1 pound (=32 Cub. inches) the temperature of the spring being 7° R. (= 8,7° C.) and with the normal stand of the barometer;	
Free and half-free carbonic acid	48,42
Carbonic acid quite free	38,37

**Action and use of the water.**

The action and the use of our acidulous chalybeate springs agrees, as far as we have hitherto observed, so much with better known, analogous waters, that in this compendious treatise we may restrict ourselves to a few observations, With the specific action of the iron, that reforms the blood and strengthens the nervous and muscular system is combined the agency of the dissolving salts on the digestive functions and the secretions of the intestines and the nerves, the effect is increased by the well known animating, stimulating action of the carbonic acid gas and its beneficial influence on the functions of the stomach. During the use of the chalybeate waters the appetite soon increases, the general looks and the tone of the muscles improve. The secretion of the intestines are rarely interrupted, the diurese constantly augments; persons disposed to congestions and giddiness sometimes even feel the intoxicating action of the carbonic acid.

The waters are drunk, not too hastily, in the morning, before eating, in pauses of from 15—20 minutes, beginning with three glasses, which are gradually increased to six;

patients disposed to cough, laryngeal catarrh, gastrodynia etc. add a little warm milk to the dose.

The baths, very analogous in their strengthening action to those of St. Moritz, are generally taken daily. In the beginning they are rather exciting, in that case they are better attenuated by adding sweet water. The carbonic acid gas abundantly contained in them directly covers the body of the bathing person with numberless bubbles of the size of millet-grains; an expressly made analysis has besides shown that Iron and acid carbonic gas are even contained in water which has been employed in bathing and has remained in the baignoire.

With respect to diet more freedom can in general be granted tho the patients, than in the saline water course. Although the above indicated rules for avoiding certain kinds of food, being «contrary to the course» must also be observed yet in the individual case regard may be paid to the increased appetite as being a natural consequence of the more bracing climate and the greater impulsion given to the process of assimilation. With respect to climate and to exercise we refer to what we have before said.

## **Indications and contraindications.**

A beneficial action of our acidulous chalybeate waters may be expected especially in the following diseases.

1. After losses of blood (in consequence of delivery etc.) in cases of convalescence and weakness without fever.
- 2) Particularly in cases of irritation and weakness of the nervous system, in consequence of dissolute life,

excessive head work, especially in persons who were formerly strong.

3. In chlorosis, anemia, disorders of menstruation, leucorrhoea.
4. In hemicrania, gastralgical disorders.
5. In chronic merely catarrhal irritation of the larynx and the bronchi.

The acidulous chalybeate waters are of course contraindicated in cases of plethora, disposition to phlogistic congestion, apoplexy and active bleeding.

The **sulphuretted hydrogen** containing springs of Plafna and Val Dragun are likewise destined to play their part in the therapeutic apparatus of Tarasp-Schuls. Separate bathing cabinets for them will however be established only at a later period. We first expect further analytical disclosures. Hitherto only the spring of Plafna (undoubtedly soiled with atmospheric water) has been examined; the Dragun spring is certainly richer and appears to be an acidulous chalybeate spring saturated with sulphuretted hydrogen.

Supply of water above 1500 cub. quintals per minute.

Specific weight: 1.005.

The Analysis has shown:

In 1 pound = 7680 grains are contained;

(The carbonic acid salts being calculated as simple carbonates.)

*Fixed ingredients:*

Sulphate of Potass	.	.	.	.	0,1896
"    of Soda	.	.	.	.	0,4055
Muriate of Soda	.	.	.	.	0,1628
"    of magnesia	.	.	.	.	0,0391
"    of Lime	.	.	.	.	0,3624
Carbonate of Lime	.	.	.	.	0,7633
Carbonate of Protoxyde of Iron	.	.	.	.	0,1643
Silex	.	.	.	.	0,2457
				Total of fixed substances	2,3327

*Gaseous constituents:*

Free and half-free carbonic acid	3,5826
Carbonic acid quite free	3,1848
Sulphuretted hydrogen	0,0184

A more precise estimation as to the peculiar character of the Tarasp sulphur springs will therefore only be arrived at after they have been properly enclosed and further analytical and clinical experiences have been made.

The employment of the „**mofettes**“ for therapeutical purposes has hitherto not yet been attempted; the very strong exhalations of carbonic acid gas of the Felix mofette (which almost immediately kills smaller animals even fowl) might without doubt be made available for this purpose. Hitherto however this has in no way be attempted, the more as the therapeutical value of such gas baths, douches etc. is not yet at all sufficiently proved.

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Herewith we terminate our succinct survey of our mineral springs, of which we are persuaded, that being now organized in conformity with the wants of our time and being made easily accessible they will attract a rapidly increasing number of visitors and will acquire everywhere the fame due to them among the first baths of Europe, from the richness and variety of the mineral waters joined to all the charms and advantages of a grandiose nature and a bracing alpine climate.

Dr. Killias.

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### Recent publications on the springs.

Kaiser, J. A. Dr. Die Mineralquellen zu Tarasp. Chur, 1847.

„ The mineral springs of Tarasp. Coire, 1847.

v. Planta A. Dr. Chemische Untersuchung der Heilquellen zu Schuls und Tarasp im Kanton Graubünden. Chur, 1859.

„ Chemical analysis of the mineral springs of Schuls and Tarasp in the canton of Grisons. Coire 1859.

Meyer-Ahrens C. Dr. Die Heilquellen zu Tarasp und Schuls. Separatabdruck aus dessen Werke: „Die Heilquellen und Curorte der Schweiz.“ Zürich 1860.

„ The mineral springs of Tarasp and Schuls. Separately printed from his work: „The mineral springs and baths of Switzerland.“ Zürich 1860.

Lebert H. Professor. Das Engadin, seine Mineralquellen. Oeffentlicher Vortrag. Breslau 1861.

„ The Engadine and its mineral springs. Public lecture. Breslau 1861.

Balardini L. Dr. Le fonti minerali di Tarasp e di Scollio. Brescia 1862.

„ The mineral springs of Tarasp and Schuls. Brescia 1861.

Lee Edw. Dr. Tarasp-Schuls“ in his newest balneological work: „The principal baths of Switzerland and Savoy. London 1865.

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### Directions.

Resident physician: *Dr. Ed. Killias.*

For rooms etc. apply to the

## Bad Hotel Tarasp-Schuls (Nairs) Engadin.

See page 36.

Exportation of the mineral waters: Depot of the Tarasp-Schuls society, Coire, Administration of the exportation at the establishment of Tarasp.

The waters (saline and chalybeate) are exported in chests of 30 large or 30 small bottles.

## Communications.

1. By rail to Coire, thence across the Albula or Julier with the mail-coach to Schuls, in one day. This route will be greatly abridged when the projected road across the Fluela passage will be constructed.
2. From Chiavenna by Maloja, Samaden etc. Mailcoach.
3. From Tyrol (Meran-Nauders, Innspruck-Finstermünz) by Martinsbrück to Schuls. Mail-coach.
4. By rail to Landquart (near Coire), thence across the Fluela with the mail-coach to the Establishment; — from Zuric, St. Gall or Rorschach in one day.



